Statewide Orthoimagery 2010 Data Delivery (excerpts for imagery review)

Center for Geographic Information and Analysis
Tim Johnson, Director

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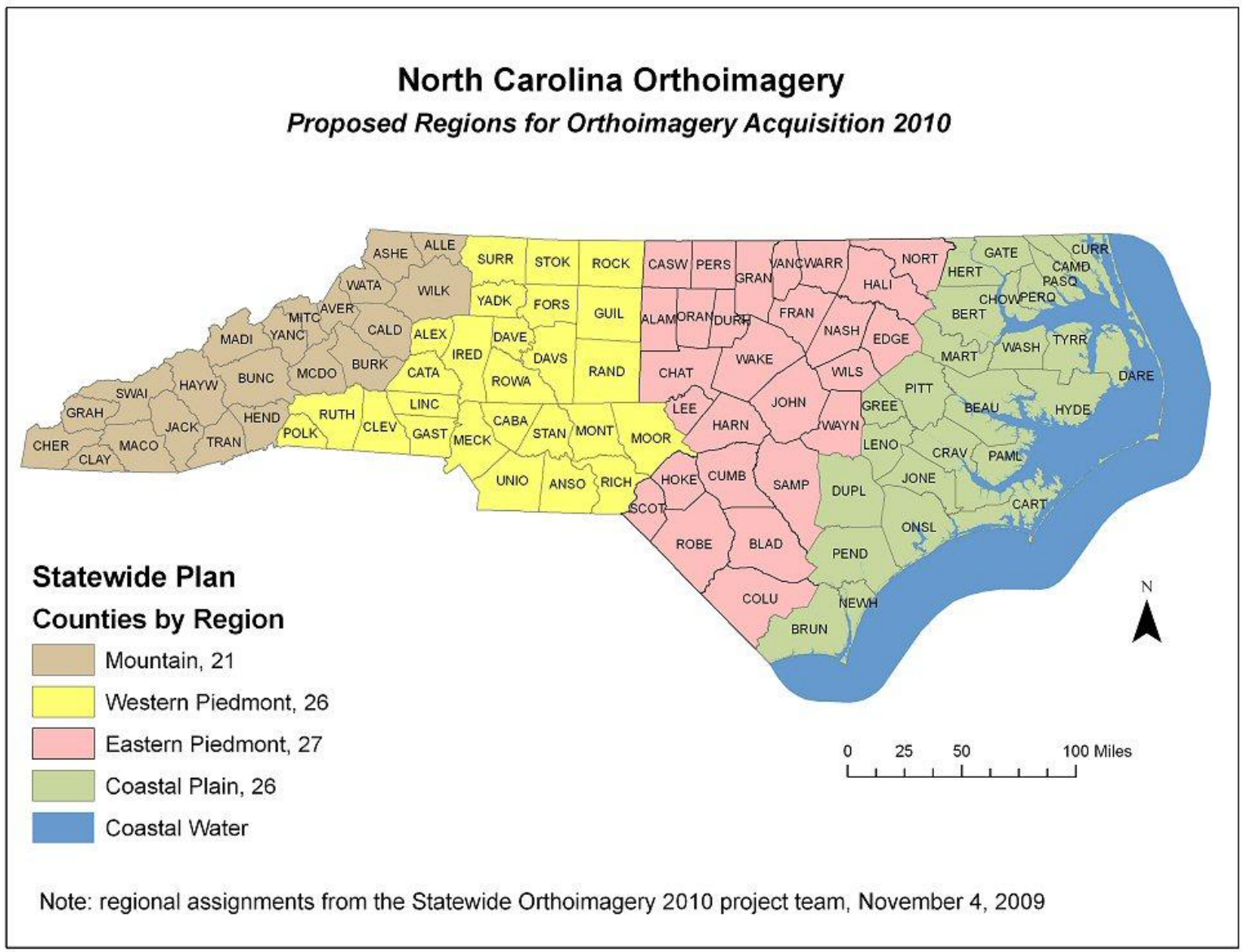
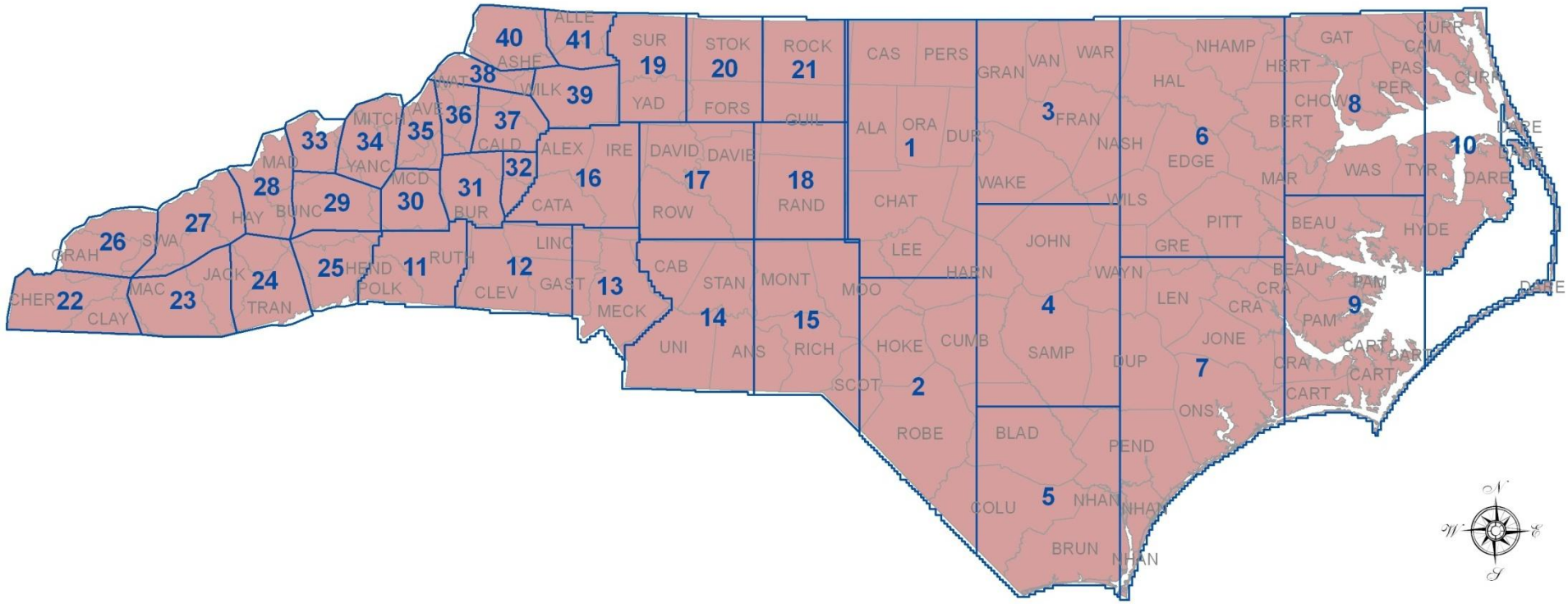
Project In Brief

- City of Durham PSAP
- Funded by NC 911 Board
- 100 counties
- Flights – early 2010
- Imagery to counties – early 2011
- 59,000 “tiles” (5,000 by 5,000 feet)
- 6-inch ground resolution



Four regions for image acquisition, processing and delivery. Contractors were Sanborn (Mts), Photo Science (W. Peid.), Surdex (E. Pied),and AeroMetric (coastal).

Blocks for Aerial Triangulation and Processing



Contractors used large blocks for aerial triangulation and processing. Larger in the east where gentle slopes and long North-South flight lines.

Legend

- ESP_AT_Blocks
- FinalATBlocks
- BOUNDARY_CountyOutlines

Visual QC

- Third party quality control – AECOM
- Selected tiles
- Attention to edges of regions (four processing contractors)
- Expectations

NC Specifications

"NC Technical Specifications for Digital Orthophoto Base Mapping" from Land Records Management Program in the Secretary of State's Office (2009):

- Methods
- Formats
- Quality and accuracy
- Reports certified by surveyor licensed in NC

Visual Quality Control

Areas of great importance

- Transportation
- Major bridges
- Urban areas
- No seam lines cutting buildings or large structures
- Areas of state importance
- Color and contrast well balanced at seam edges between contractors

Areas of least importance

- Highly vegetated areas
- Water bodies (color and seam lines)
- Utility lines above the ground

Is the imagery flawless?

- High quality, but not perfect
- Contractors: 25 percent of tiles inspected
- CGIA: 5 percent of tiles inspected (focus on transportation and urban cores)
- 70-75 percent not inspected unless a systematic problem in the sample
- Positional accuracy from sample points, not every location

What is a Flaw?

- What is a flaw that should be fixed?
  - Project expectations
  - What is the cost of misrepresentation of a feature?
  - What is the effort to modify?
  - State Specifications
- Contact CGIA
- 90-day period before final repairs

Visual Quality is High

Cumberland County example

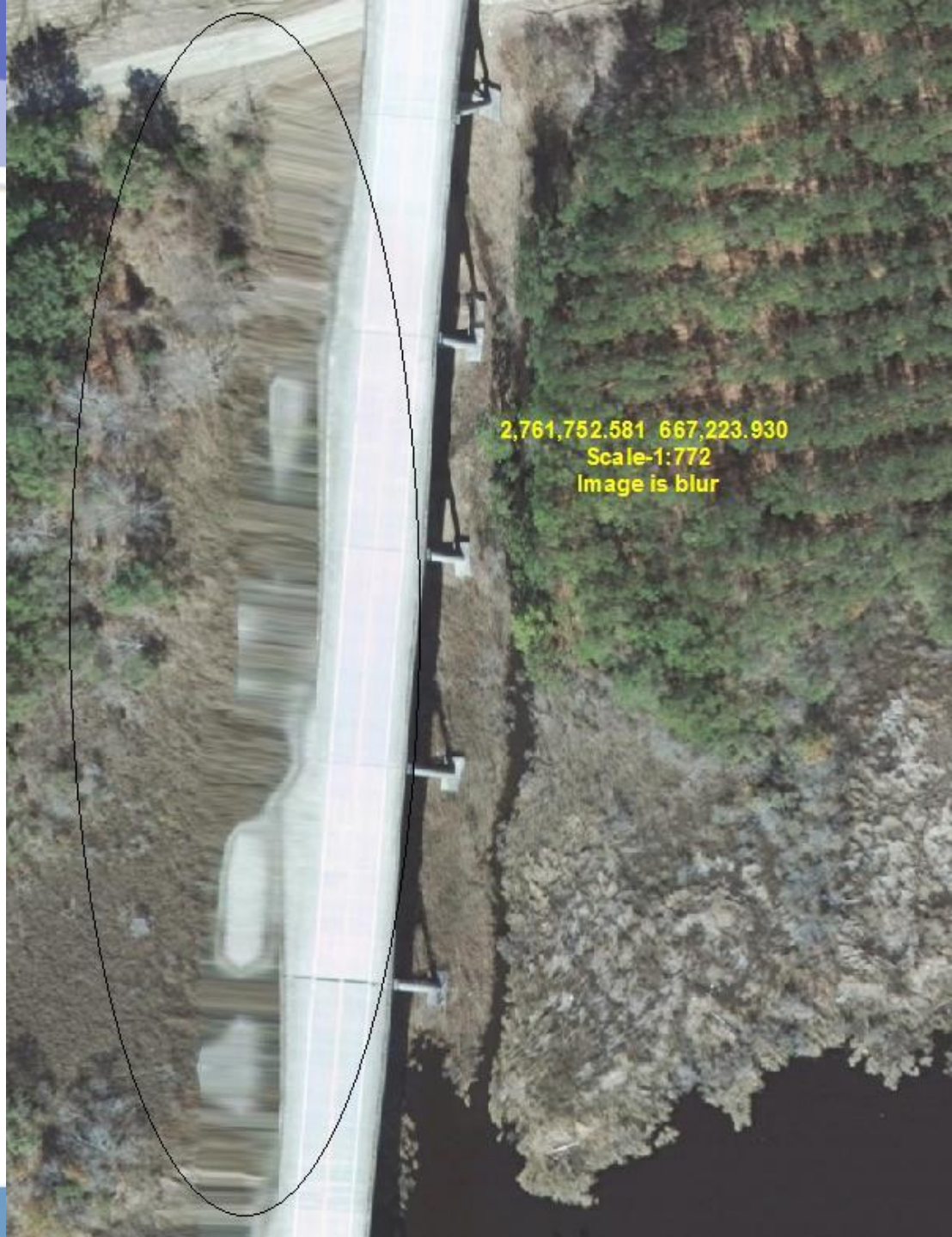
Bay River, Pamlico County example.

Stonewall in Pamlico County example

What you should not see

- Major bridge is distorted
- Transportation feature cut and offset by a seam line
- Tall building is cut by a seam line or is leaning extremely
- Areas of state importance distorted or obscured
- Color and contrast changes abruptly at seam edges between contractors
- Artifacts from a flaw in rectification
- Wash out from brightness or too dark to see features

Automated processing based on digital elevation model distorted the elevated highway in this example. Elevated features can be warped in processing, but can be fixed.



Same example after repair.

Combination of digital exposures into tiles requires subtle seams between exposures. This example has abrupt seam lines and displaced roadways. This can be fixed.

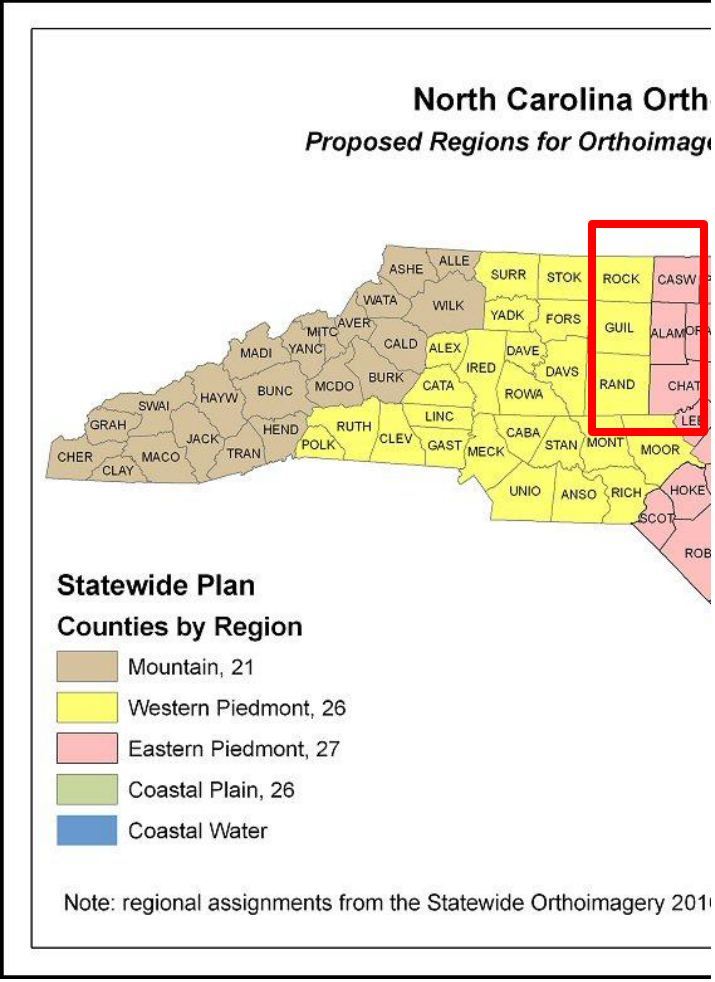
This example has abrupt seam lines and displaced features. This can be fixed.

This is an example of an anomaly from an automated process. Parts of the images were pulled toward an elevation point in the water. This can be fixed.

Same example after repair.

What is acceptable?

- Color balance between regions / contractors
- Some building lean (not nadir)
- Bright roof tops
- Power lines discontinuous
- Leaning trees
- Water as is
- No tiles in the sounds



Color balance varies from one region to the next. Color balancing relied on statistics from sample locations within a region. Contractors smoothed color balance in tiles at the edge of regions.

Some of the tallest buildings appear to lean over adjacent features. Some lean is acceptable and inevitable because the digital sensors are not directly above all tall buildings.

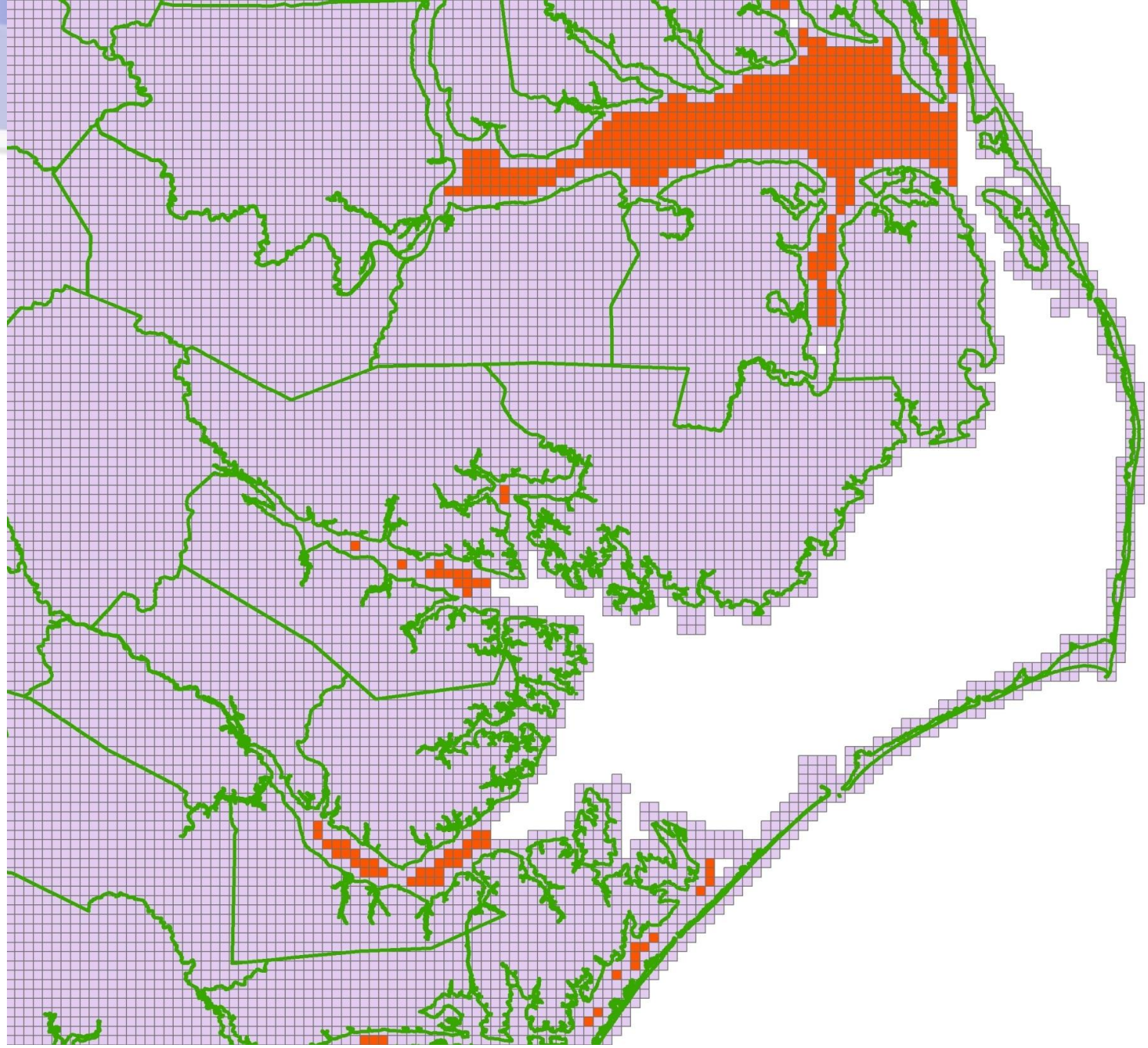
Some locations are bright where rooftops soils or concrete are very reflective.
If feature outlines are not washed out, this is acceptable.
Adjacent areas may get too dark if the tile were darkened.

Features high above the ground such as power lines in this example may appear distorted or displaced. Photos are rectified to the ground, not to elevated features. This is an example of acceptable visual quality.

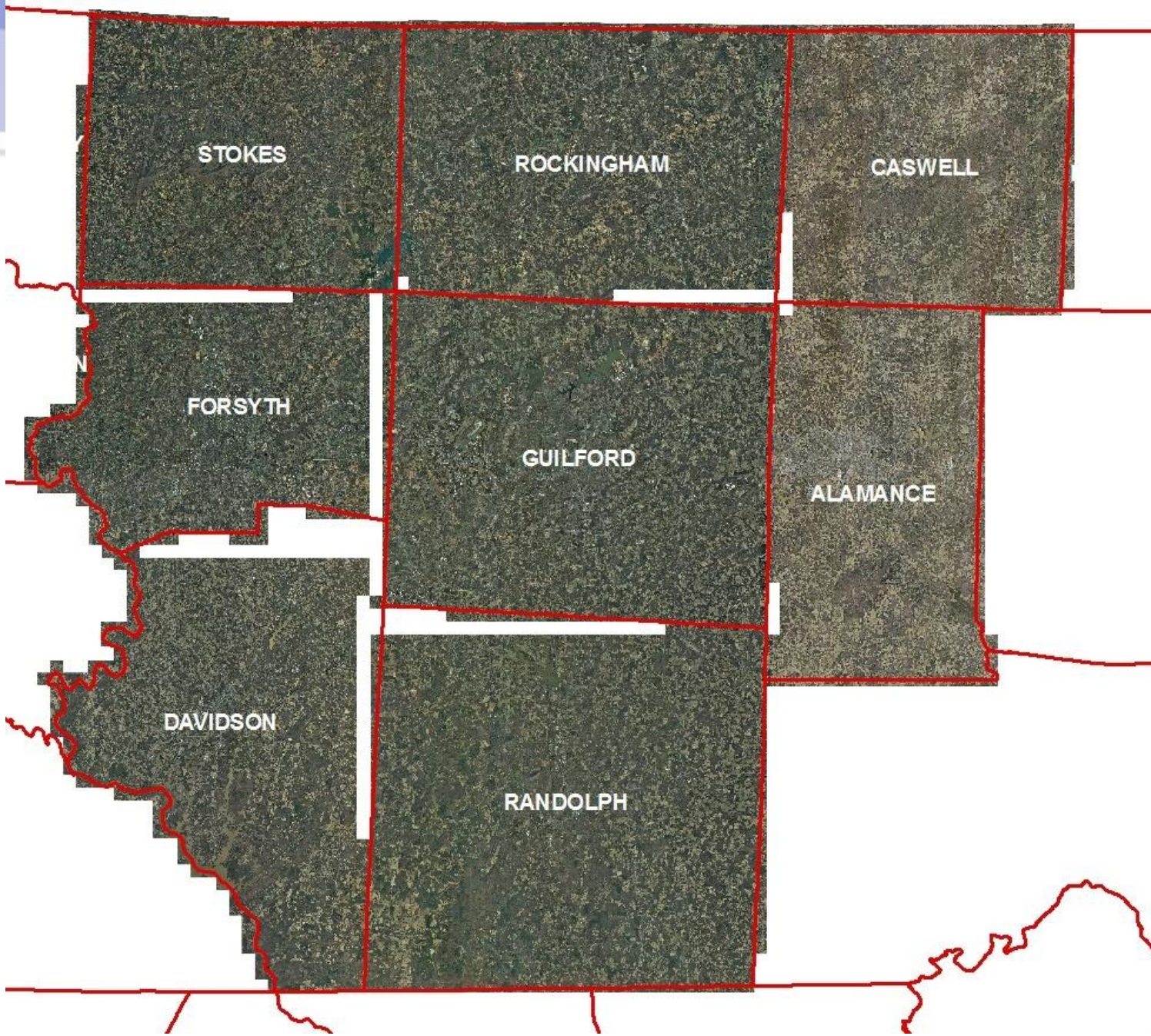
Some locations have trees that partly obscure roads. Some of this is inevitable given camera angles and vegetation. The north and south portions of the road are visible and can be extrapolated for 911 and GIS purposes.

Water reflects differently from different flight lines and images. Contractors were not expected to color balance large water bodies like the one in this example.

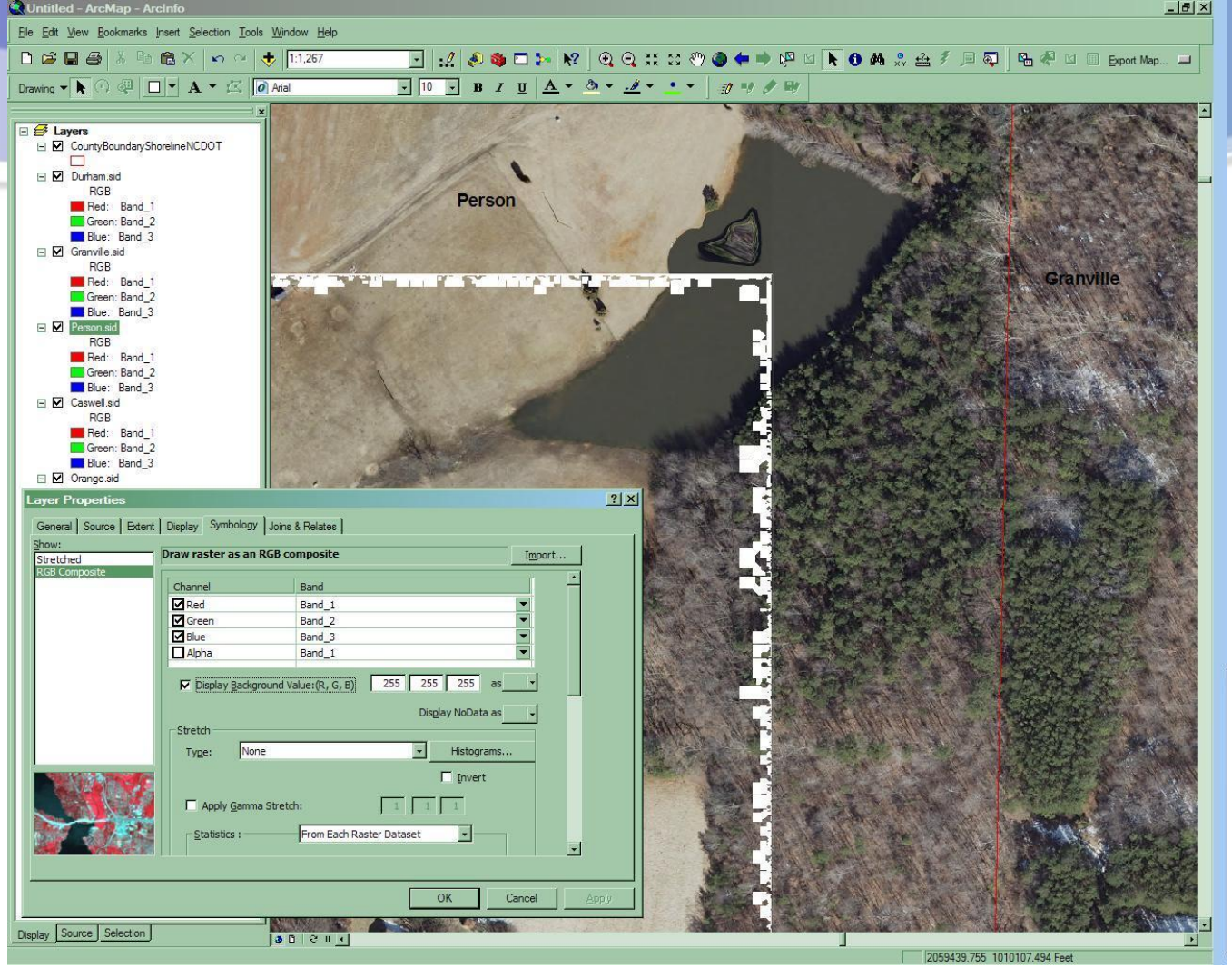
The project did not acquire images over the sounds. Recent imagery from NOAA is included in distribution (orange tiles). The large area of open water in the sounds will not have imagery tiles.



If you display multiple county mosaics, white space will appear in counties displayed under an adjacent county. The compression software creates a rectangle to include county tiles. Where boundaries are irregular, parts of the rectangle have no imagery from that county.



A solution is to go to the layer properties for a mosaic, and display background value as 255-255-255. This nearly eliminates the white pixels, but a few may remain (software bug) as shown in this example. If zoomed in far enough to see the white pixels, change the display order of the county mosaics.
There is no current fix to this display problem.
There is no missing data in any of the county mosaics.



What if you find a flaw?

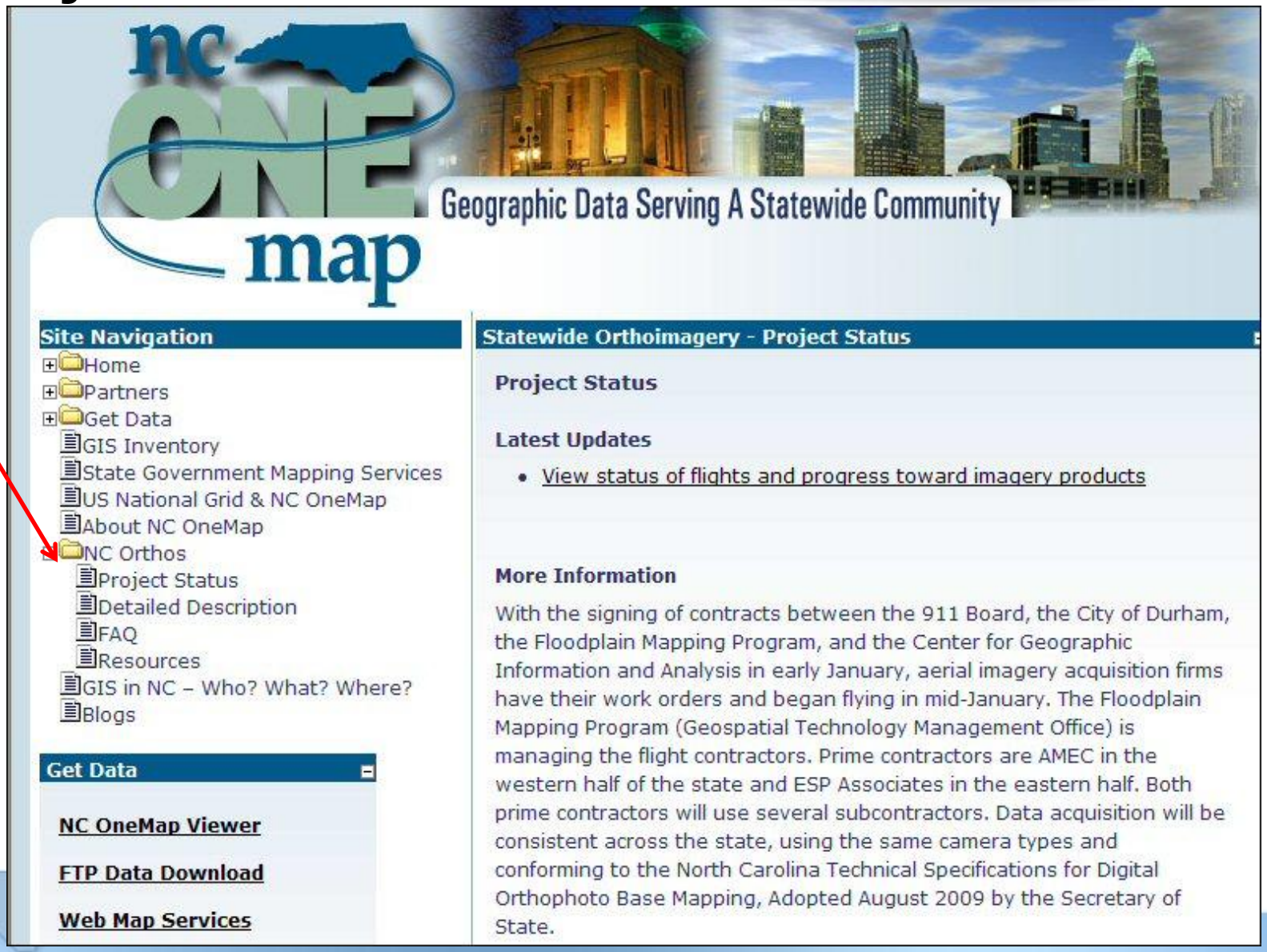
- 90-day period for review
- Contact your county 911 or GIS coordinator and CGIA (Darrin Smith or Jeff Brown) with the issue
- Include the image name and a snapshot if practical
- Project team will review
- If deemed a flaw that can be fixed, replacement tiles will be generated after the 90-day period

Reminder: Share the Data

- Expected sharing:
  - PSAPs within your county
  - GIS operations in municipalities
- NC OneMap for online access (**www.nconemap.gov**)
  - Download
  - Imagery services by end of May

- Requests for copies – data are public records; distribute as you wish.

Project Information Online



911 Board Feedback

- The Board invites *your* feedback
- 4-Year Quarter State Plan
- Next Generation 911
- Richard Taylor, Executive Director

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Acknowledgements

- NC 911 Board
- City of Durham
- CGIA staff
- Geospatial and Technology Management Office
- NC Geodetic Survey
- Land Records Management, Secretary of State
- Private contractors
- USGS and NGA
- NC ITS: Enterprise Project Management Office; Hosting Services
- State Chief Information Officer
- GICC and Statewide Mapping Advisory Committee
- Working Group for Orthophotography Planning
- Local Government Committee

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